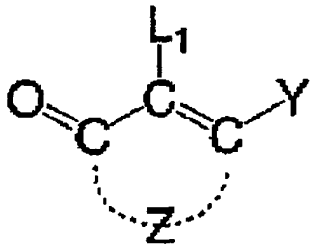
WHAT IS CLAIMED IS:

1. A photothermographic material comprising, on one surface of a support, a photosensitive silver halide, a non-photosensitive organic silver salt, a reducing agent for a silver ion, and a binder, which are applied to the support using an organic solvent, wherein the photothermographic material further comprises at least one compound selected from the group of compounds consisting of a compound represented by the following general formula (1), a compound having a β-lactam ring, and a compound having a group that is adsorptive to a silver halide and a group that reduces a silver halide, or a precursor of the compound having a group that is adsorptive to a silver halide and a group that reduces a silver halide:

General formula (1)



wherein in general formula (1),

Y represents a hydroxyl group or an $-NL_2L_3$ group, in which L_2 and L_3 may be same as or different from each other and each independently represent a hydrogen atom, an alkyl group, or an aryl group;

L_1 represents a sulfur-containing saturated heterocyclic residue,

an alkyl group, an aryl group, or a hydrogen group, a group represented by –A-S-B in which A represents an alkylene group and B represents a hydrogen atom, an alkyl group, or an aryl group; and

Z represents an atomic group required for forming a 5- or 6-membered carbon ring which may have a substituent.

2. The photothermographic material according to claim 1, wherein a content of silver iodide in the photosensitive silver halide is from 40% by mol to 100% by mol.

3. The photothermographic material according to claim 1, wherein an average grain diameter of the photosensitive silver halide is from 5 nm to 80 nm.

4. The photothermographic material according to claim 1, wherein L_1 in general formula (1) represents a sulfur-containing saturated heterocyclic residue or a group represented by –A-S-B.

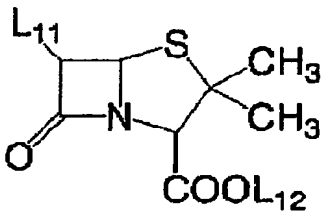
5. The photothermographic material according to claim 1, wherein Z in general formula (1) represents an atomic group required for forming a 6-membered carbon ring.

6. The photothermographic material according to claim 1, wherein Y in general formula (1) represents a hydroxyl group.

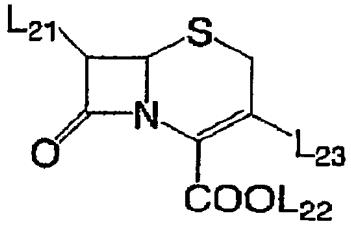
7. The photothermographic material according to claim 1, wherein the compound having a β-lactam ring is a penicillin or a cephalosporin.

8. The photothermographic material according to claim 7, wherein the penicillin is represented by the following general formula (2), and the cephalosporin is represented by the following general formula (3):

General formula (2)



General formula (3)



wherein in general formulae (2) and (3),

L_{11} and L_{21} each independently represent an amino group or a substituted amino group;

L_{12} and L_{22} each independently represent a hydrogen atom, an alkaline metal ion, a quaternary ammonium ion, a hydrocarbon, or a heterocyclic residue; and

L_{23} represents a hydrogen atom, a halogen atom, an amino group, a hydroxyl group, a mercapto group, an alkyl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an acyloxy group, an acylthio group, a formyl group, or a heterocyclic residue.

9. The photothermographic material according to claim 8, wherein in general formulae (2) and (3),

L_{11} and L_{21} each independently represent an amino group or an acylamino group;

L_{21} and L_{22} each independently represent a hydrogen atom, an alkaline metal ion, or an ammonium ion; and

L_{23} represents a non-substituted or substituted alkyl group.

10. The photothermographic material according to claim 1, wherein the compound having a group that is adsorptive to a silver halide and a group that reduces a silver halide is a compound represented by the following general formula (4):

General formula (4) E-(W)n-F

wherein in general formula (4),

E represents an atomic group containing a group that can be adsorbed to a silver halide;

W represents a divalent linking group;

n represents 0 or 1; and

F represents a reducing group.

11. The photothermographic material according to claim 10, wherein the group that can be adsorbed to a silver halide in general formula (4) is a mercapto group, a thione group, or a group that generates an imino silver.

12. The photothermographic material according to claim 11, wherein the group that can be adsorbed to a silver halide in general formula (4) is a mercapto group.

13. The photothermographic material according to claim 10, wherein the group that can be adsorbed to a silver halide in general formula (4) is a group derived from a member selected from the group consisting of hydroxylamines, hydroxamic acids, hydroxyureas, hydroxysemicarbazides, phenols, hydrazines, hydrazides, and 3-pyrazolidones.

14. The photothermographic material according to claim 13, wherein the group that can be adsorbed to a silver halide in general formula (4) is a group derived from a member selected from the group consisting of hydroxyureas, hydroxysemicarbazides, phenols, hydrazides, and 3-pyrazolidones.

15. The photothermographic material according to claim 1, wherein the precursor is a compound which generates a mercapto group.

16. The photothermographic material according to claim 1, wherein the precursor is a thiazolium, a thiazoline, a thiazolidine, or a disufide.

17. The photothermographic material according to claim 1,

wherein the precursor is a thiazolium having a triple bond on a substituent.

18. The photothermographic material according to claim 1, wherein an average grain size of the photosensitive silver halide is from 5 nm to 50 nm.

19. The photothermographic material according to claim 1, wherein a content of silver iodide in the photosensitive silver halide is from 90% by mol to 100% by mol.

20. The photothermographic material according to claim 1 comprising, as the binder, polyvinyl butyral in an amount of 50% by weight to 100% by weight based on a total binder component in a photosensitive layer which is provided on the support.